

NEW SPECIES OF HYDROPSYCHIDAE (INSECTA: TRICHOPTERA)  
FROM NORTHERN AUSTRALIA

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Abstract

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Five new species of hydropsychid caddisflies of northern Australia are described from males, females and larvae: *Cheumatopsyche kakaduensis* sp. nov., *C. suteri* sp. nov., *C. well-sae* sp. nov., *C. dostinei* sp. nov. and *Asmicridea capricornica* sp. nov. *Cheumatopsyche kakaduensis* sp. nov. has thus far only been recorded from Kakadu National Park, while the remaining four species are widely distributed across northern Australia. Distribution maps are presented with keys for identification of males, females and larvae.

Introduction

Caddisflies of the family Hydropsychidae of northern Australia are poorly known. In recent years a large amount of material from the Alligator Rivers region, Northern Territory, has been accumulated and a smaller amount from north-western Australia. Four new species of *Cheumatopsyche* Wallengren, 1891 and one of *Asmicridea* Mosely, 1953 are described here from this material. Distribution records for northern Australia (including North Queensland) are presented. Additional undescribed species are known from Cape York Peninsula and the Queensland wet tropics but are outside the scope of the present study.

Although only one species of *Cheumatopsyche* has been described from Australia, recent examination of larval material has revealed the existence of at least 18 species (Dean, 1999). *Cheumatopsyche modica* (McLachlan, 1871) was described from material collected in Victoria. While the name has subsequently been applied to all adult Australian *Cheumatopsyche* material, probably in part a consequence of the conservative male and female genitalia, the identity of the described species has yet to be determined. Of six larval species currently known from Victoria, any one of three or four could be *C. modica*. Since none of these species occurs in northern Australia, description of northern species can proceed prior to the identity of *C. modica* being established. A similar situation exists in *Asmicridea*. Although larvae of the two described species have yet to be determined, type localities for both species are in southern Australia. The northern

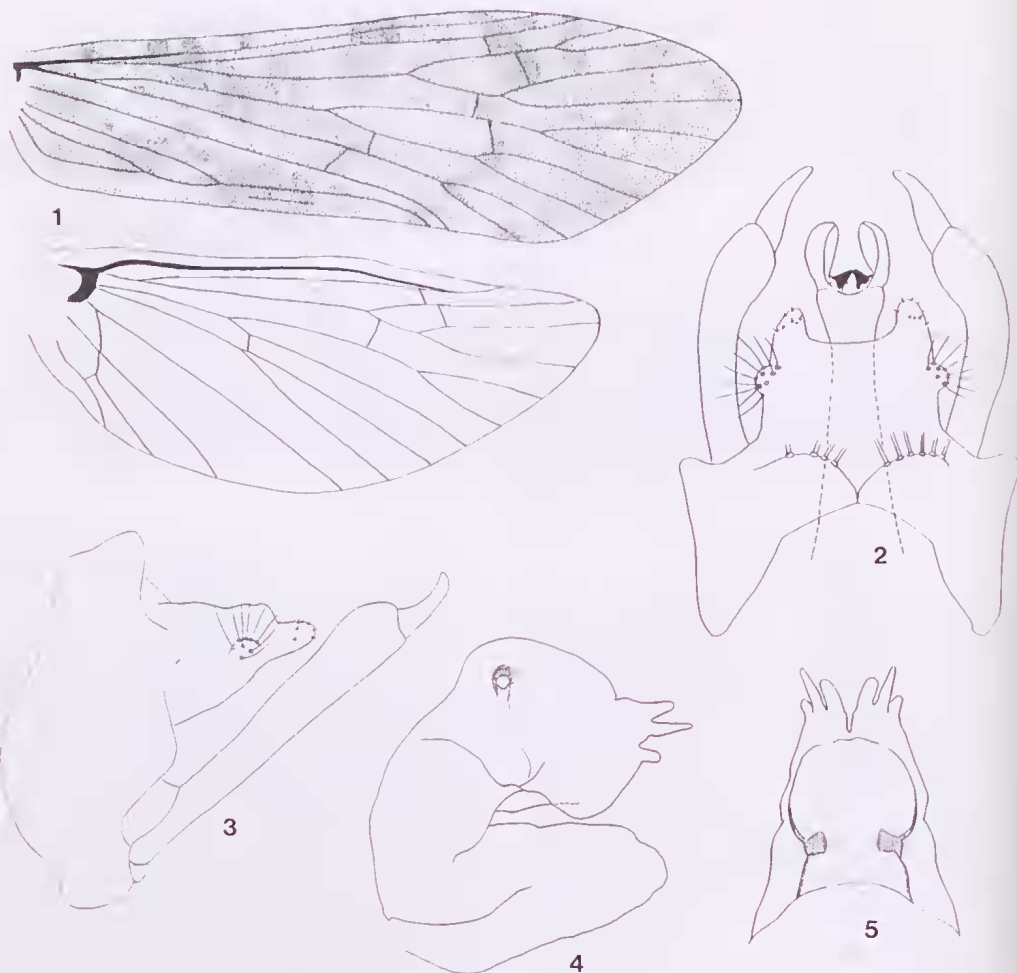
Australia larva described below is clearly different from all larvae known from southern Australia (Dean, 1999).

Associations of adults and larvae have been achieved by collection of pupal chambers containing pharate male pupae and associated larval sclerites. Observations on colour are based on material preserved in 70% ethanol. Adult genitalia have been prepared for examination by clearing in cold potassium hydroxide for 24–48 hours. Terminology for adults follows Nimmo (1987), while that for larvae follows Wiggins (1977) and Shefter and Wiggins (1986). Type material has been lodged in Museum Victoria, Melbourne (NMV) or the Australian National Insect Collection, Canberra (ANIC). Material without a stated repository is lodged in Museum Victoria. Not all of the material examined is listed below and a full listing is available from the author. Abbreviations for material examined are: M, adult male; F, adult female; MP, male pupa; FP, female pupa; P, unsexed pupa; L, larva. Abbreviations for collectors are: AW (A. Wells), DC (D. Cartwright), JB (J. Blyth), JD (J. Dean), JEB (J.E. Bishop), MBM (M.S. and B.J. Moulds), PD (P. Dostine), PS (P. Suter).

*Cheumatopsyche kakaduensis* sp. nov.

Figures 1–11

*Type material.* Holotype: adult male, Gulungul Creek, Radon Springs, Northern Territory (12°45'S 132°55'E), 13–14 Apr 1989, P. Suter and A. Wells (NMV T-17415). Paratypes collected with holotype: 6 males, 6 females (NMV); 5 males, 5 females (ANIC).

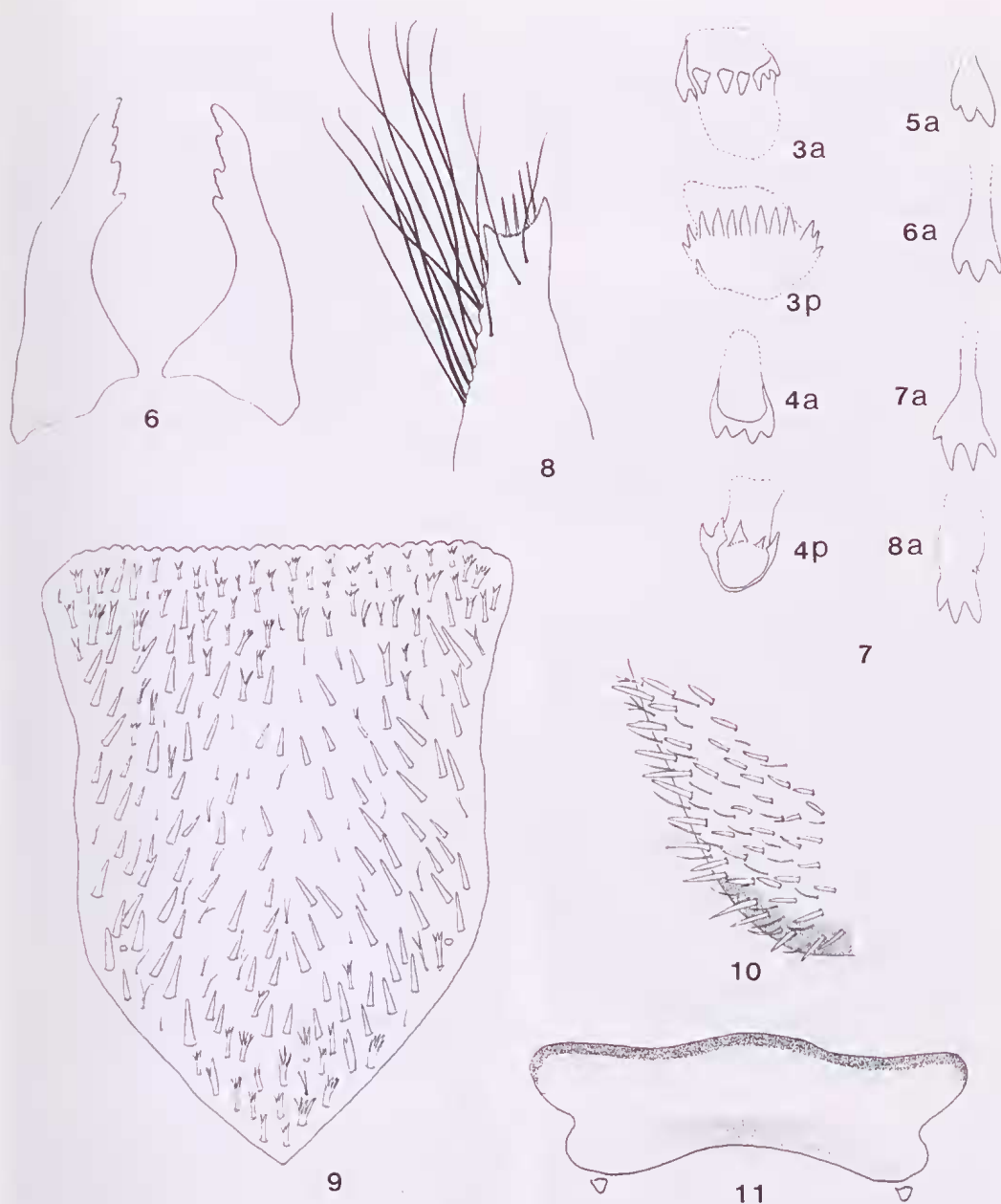


Figures 1–5 *Cheumatopsyche kakaduensis* sp. nov. Adult: 1, wings; 2, male genitalia, dorsal; 3, male genitalia, lateral; 4, female genitalia, lateral; 5, female genitalia, dorsal.

*Other material examined. Northern Territory.* Numerous M, F, P, and L, collected with holotype; 1M, Graveside Creek (13°18'S 132°32'E), 18 Jul 1988, PD; 2P, 1L, Little Nourlangie Rock Creek (12°52'S 132°48'E), 22 Apr 1989, PS and AW; 2L, creek 5 km W of Gimbat OSS field station (13°33'S 132°34'E), 19 Apr 1989, AW and PS; 2P, 47L, Baroalba Springs (12°49'S 132°52'E), various dates, AW and PS, DC; 2L, Magela Creek, d/s Magela Falls (12°46'S 133°6'E), various dates, AW and PS, DC; 2L, Carbo Creek (13°17'S 132°51'E), 29 May 1988, AW and PS; 1L, Barramundie Creek, d/s Falls (13°22'S 132°28'E), 26

May 1988, AW and PS; 3L, Lone Spring (12°17'S 132°36'E), 21 Aug 1999, JD.

*Description. Adult.* General colour dark brown, almost black. Vertex of head dark brown; antennae straw-coloured; thorax medium brown. Wings (Fig. 1): forewing dark brown, irrorate; hindwing uniformly paler brown. Length of forewing 4.9–6.1 mm (male), 5.0–6.3 mm (female). Male genitalia (Figs 2, 3): distal lobes of tergum X rounded, not turned up apically.



Figures 6–11 *Cheumatopsyche kakaduensis* sp. nov. Pupa: 6, mandibles; 7, abdominal hook plates (3–8: abdominal segment number, a: anterior hook plate, p: posterior hook plate); 8, apical process of abdomen. Larva: 9, fronto-clypeus; 10, pronotum, anterolateral margin; 11, prosternites.

separated by a distance approximately 3 times their width; pre-anal appendages squat, located well forward of base of distal lobe; terminal segment of clasper about quarter length of basal segment; dorsum of abdominal segment IX broad in lateral view. Female genitalia (Figs 4, 5): clasper receptacle small, shallow; inner aperture aligned with outer aperture, clearly visible in lateral view; separation of receptacles in dorsal view 2–3 times width of each receptacle.

**Pupa.** Right mandible with 3 subapical teeth, left mandible with 4 (Fig. 6). Paired hook plates on abdominal segments 3–8; anterior plates on segments 3–8 and posterior plates on segments 3 and 4 only (Fig. 7); some variation in number of teeth on all plates. Apical processes of abdomen (Fig. 8) with apicolateral angles acute, separated by shallow concave surface covered by small protuberances; outer margin of each process fringed with long black setae, ventral surface with series of pale spine-like setae which protrude beyond apex.

**Mature larva.** Head and thoracic sclerites predominantly medium-dark brown; unpigmented area surrounding each eye; small pale region in centre of frontoclypeus. Frontoclypeus length: width ratio 1.54–1.59; anterior margin finely crenulate with about 25 lobes (Fig. 9). Head and pronotum densely covered with conspicuous spine-like setae; those near posterior angle of frontoclypeus brush-like (Fig. 9); primary seta 17 on head short, length much less than distance from setal base to apex of frontoclypeus; primary seta 22 near anterolateral margin of pronotum short, robust, not much longer than adjacent secondary setae (Fig. 10). Posterior prosternites reduced to small flecks, one adjacent to each posterolateral angle of anterior prosternite (Fig. 11). Abdominal gills present on segments 1–7.

**Etymology.** The name reflects the apparent restriction of the species to Kakadu National Park.

**Comments.** *C. kakaduensis* appears to have a limited distribution having been recorded only from a few small creeks close to the escarpment and from one lowland spring (Fig. 53). The larva has previously been designated *Cheumatopsyche* sp. 10 (Wells, 1991) and *Cheumatopsyche* sp. AV10 (Dean, 1999).

*Cheumatopsyche suteri* sp. nov.

Figures 12–21

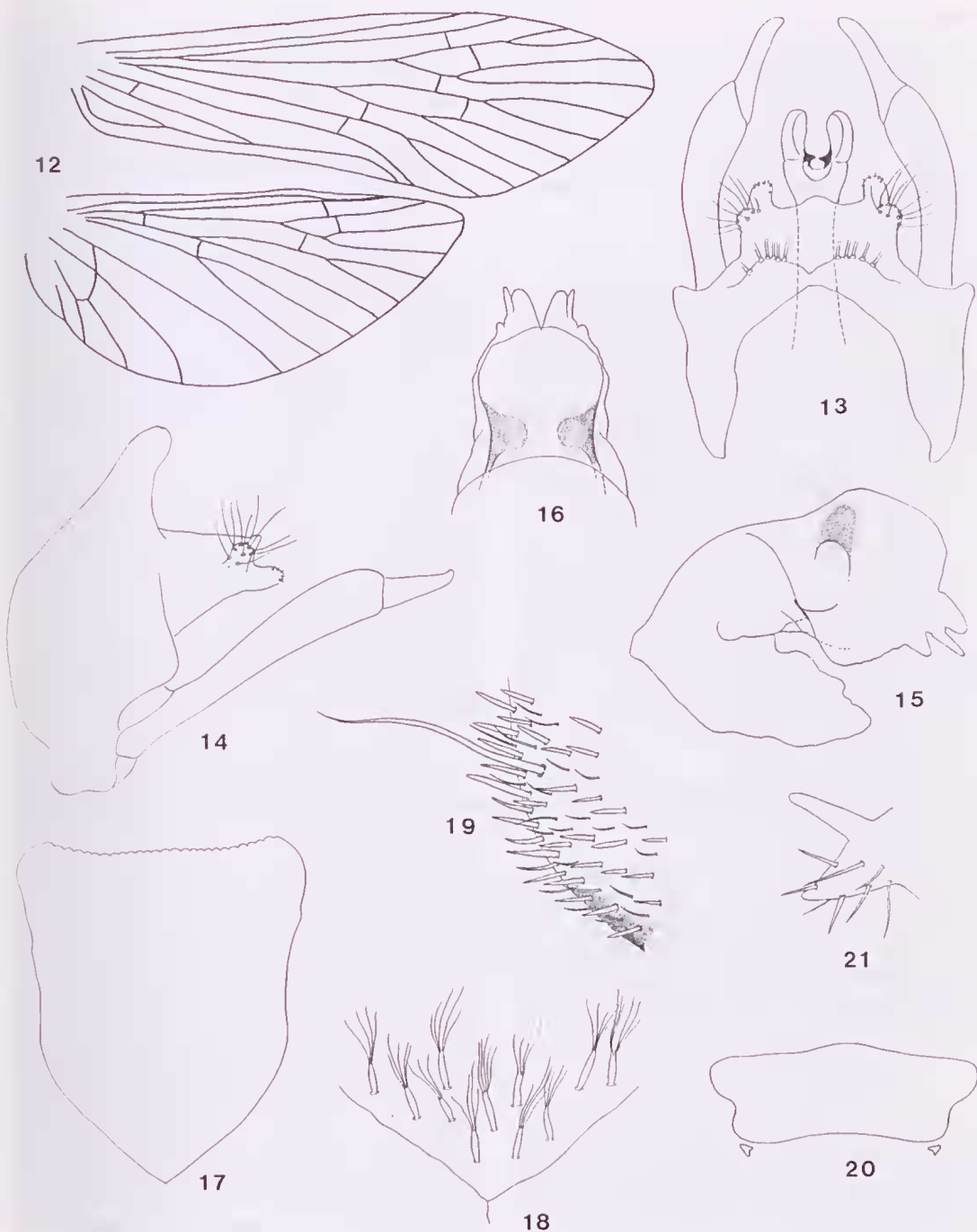
**Type material.** Holotype: adult male, South Alligator River, Gimbat OSS Field Station, Northern Territory

(13°35'S 132°36'E), 24 May 1988, A. Wells and P. Suter (NMV T-17428). Paratypes collected with holotype: 7 males, 4 females (NMV); 6 males, 2 females (ANIC).

**Other material examined.** **Western Australia.** 1M, 2F, Drysdale River, Kalumburu Crossing, 28 Sep 1979, JB; 20M, 35F, Camp Creek, Mitchell Plateau, various dates, JEB, PS; 4M, Barnett River Gorge, 1 Oct 1979, JB; 15L, Manning Gorge, near Gibb River Rd, Kimberley, 28 Jul 1994, DC; 10L, King Edward River, Mitchell River Rd, 25 Sep 1995, L. Metzeling; 1L, tributary of Bell Creek, Kimberley, 27 Jul 1994, DC. **Northern Territory.** 6L, South Alligator River, Kakadu Hwy crossing (13°17'S 132°19'E), 26 May 1988, PS and AW; 2M, 2F, Jim Jim Creek, 3 km d/s falls, 1 Sep 1979, JB; 1M, 1MP, 1L, Kambolgie Creek (13°32'S 132°23'E), various dates, PS and AW, DC; 15L, Magela Creek, d/s Magela Falls (12°46'S 133°06'E), various dates, AW and PS, DC; 3M, 1F, 16L, Graveside Gorge (12°18'S 132°32'E), various dates, AW and PS, PD; 3L, Baroalba Springs, Gubara (12°49'S 132°52'E), 28 Apr 1990, DC; 4 L, Koolpin Creek (13°29'S 132°35'E), 25 May 1988, PS and AW; 1L, Nourlangie Creek (12°28'S 132°44'E), 26 May 1988, PS and AW; 2L, Lone Spring, Kakadu National Park (12°17'S 132°36'E), 21 Aug 1999, JD; 1M, 2F, Howard Springs, near Darwin, 23 Jun 1969, Le Souef; 1M, Devil Devil Creek, 70 km SW of Daly River Mission, 23 Aug 1979, JB; 4M, 1F, Katherine Gorge National Park, 13 Aug 1979, JB; 2M, Roper River, Mataranka Homestead, 25 Jan 1977, MBM; 6L, Mann River, Arnhemland (12°22'S 134°08'E), 26 Aug 1999, JD; 18L, Liverpool River, Arnhemland (12°21'S 134°07'E), 26 Aug 1999, JD; 1L, Florence Falls, Litchfield National Park (13°06'S 130°47'E), 31 Aug 1999, JD. **Queensland.** 10M, 21F, 36L, Gunshot Creek, Telegraph Crossing (11°44'S 142°29'E), Feb 1992, DC and AW; 4M, 3F, 15L, Cockatoo Creek, Telegraph Crossing (11°39'S 142°27'E), Feb 1992, DC and AW; 2MP, 4L, Canal Creek, u/s Eliot Ck junction (11°23'S 142°25'E), 6 Feb 1992, DC and AW; 1L, Peaches Creek, 3 km NE of Coen (13°42'S 143°15'E), 4 Nov 1988, K. Walker; 15M, 8F, Upper Jardine River, various sites, Oct 1979, MBM; 1M, Gordon Creek, Iron Range, 19 Apr 1975, MBM.

**Description.** **Adult.** General colour dark brown, almost-black. Vertex of head dark brown; antennae straw coloured, basal segments usually with oblique darker bands; thorax medium brown. Wings (Fig. 12): forewing medium-dark brown, weakly irrorate; hindwing uniformly paler brown. Length of forewing 5.9–7.2 mm (male), 5.7–7.1 mm (female). Male genitalia (Figs 13, 14): dorsum of tergum X mesally elevated; distal lobes of tergum X rounded, not turned up apically, separated by approximately 4 times their width; pre-anal appendages raised, elongate in lateral view, situated close to base of distal lobes; terminal segment of clasper almost a third length of





Figures 12–21 *Cheumatopsyche suteri* sp. nov. Adult: 12, wings; 13, male genitalia, dorsal; 14, male genitalia, lateral; 15, female genitalia, lateral; 16, female genitalia, dorsal. Larva: 17, frontoelypeus; 18, secondary setae near apex of frontoelypeus; 19, pronotum, anterolateral margin; 20, prosternites; 21, foretrochantin.

basal segment, narrow, apically turned inwards; dorsum of segment IX narrow in lateral view. Female genitalia (Figs 15, 16): elasper receptacle large, broadly tubular; inner aperture clearly dorsal to outer aperture, outer aperture wide, semi-circular; in dorsal view separation of receptacles usually less than width of each receptacle.

*Pupa.* Abdominal hook plates similar to *C. kakaduensis*.

*Mature larva.* Head and thoracic sclerites predominantly pale-medium brown; unpigmented area surrounding each eye. Dorsum of head somewhat flattened. Frontoelypeus length:width ratio 1.34–1.43; anterior margin finely crenulate with approximately 27 lobes (Fig. 17). Secondary setae numerous on posterior half of frontoelypeus, sparser on anterior half; some setae dark, but mostly pale and inconspicuous under dissecting microscope; setae of frontoelypeus hair-like with 4 or 5 apical filaments (Fig. 18). Primary seta 17 on head moderately long, about as long as distance from base of seta to apex of frontoelypeus. Pronotum with dark secondary setae restricted to anterior margin and region of middorsal line, setae towards lateral margins paler; primary seta 22 near anterolateral margin of pronotum long, tapered, about half length of pronotal sclerite (Fig. 19). Posterior prosternites reduced to small flecks, one adjacent to each postero-lateral angle of the anterior prosternite (Fig. 20). Abdominal gills present on segments 1–7.

*Etymology.* The species is named for Phil Suter who collected much of the material on which the present description is based.

*Comments.* The species is widely distributed across northern Australia with many records from the Northern Territory, north-western Australia and Cape York Peninsula in North Queensland (Fig. 54). The larva has previously been referred to as *Cheumatopsyche* sp. 12 (Wells, 1991) and *Cheumatopsyche* sp. AV12 (Dean, 1999).

#### *Cheumatopsyche wellsae* sp. nov.

Figures 22–30

*Type material.* Holotype: adult male, East Alligator River, Cahills Crossing, Northern Territory (12°26'S 132°58'E), 27 May 1988, A. Wells and P. Suter (NMV T-17440). Paratypes collected with holotype: 11 males, 7 females (NMV); 4 males, 4 females (ANIC).

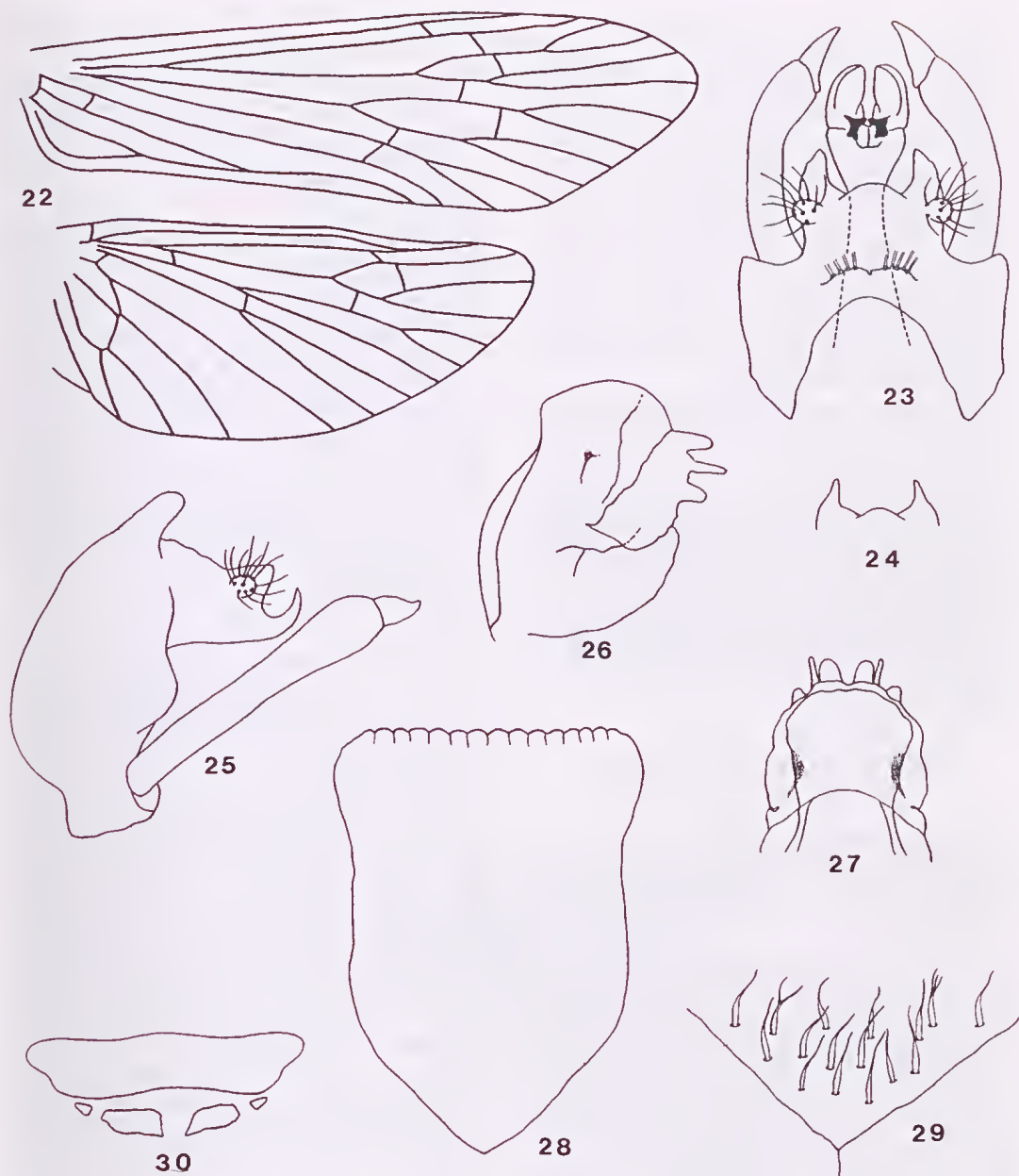
*Other material examined.* Western Australia, 1M, 1F, Drysdale River, Kalumburu Crossing, 28 Sep 1979, JB; 13M, 26F, Camp Creek and vicinity, Mitchell Plateau, various dates, JEB, PS; 1M, Barnett River Gorge, Kimberley, 1 Oct 1979, JB; 16M, 21F, Crossing pool, Millstream, Pilbara, 21 Oct 1979, JB; 19M, 29F, Fortes-

cue Falls, Hamersley Range National Park, 27 Oct 1979, JB; 39M, 34F, Ord River, 9 km N of Kununurra, 19 Sep 1979, JB; numerous M and F, Spillway Creek, Ord River Dam, 2 Feb 1978, JEB. Northern Territory, Numerous L, East Alligator River, E of Jim Jim Falls (13°12'S 133°20'E), 29 May 1988, AW and PS; 2F, 3MP, numerous L, South Alligator River, Gimbat OSS Field Station (13°35'S 132°36'E), various dates, AW and PS, PD; 1M, 4F, Jim Jim Creek, 3 km d/s falls, 1 Sep 1979, JB; 11L, Coobanbora Spring, Kakadu National Park (12°24'S 132°40'E), 21 Aug 1999, JD; 2M, 30L, Kambolgie Creek (13°32'S 132°23'E), various dates, PS and AW, DC; 1 MP, 8L, Magella Creek, u/s Magella Falls (12°47'S 133°06'E), various dates, AW and PS; 1M, 2F, 4L, Graveside Gorge (13°18'S 132°32'E), various dates, PD, AW and PS; 1L, Nourlangie Creek (12°28'S 132°44'E), 26 May 1988, PS and AW; numerous M, F, Katherine Gorge National Park, 13 Aug 1979, JB; 4M, Roper Bar, 15 Jul 1969, Le Souef; 4F, Groote Eylandt, Amagule Pool, 6 Feb 1984, M. Davies; 15L, Mann River, Arnhemland (12°22'S 134°08'E), 26 Aug 1999, JD; 13L, Liverpool River, Arnhemland (12°21'S 134°07'E), 26 Aug 1999, JD; 2L, Florence Falls, Litchfield National Park (13°06'S 130°47'E), 31 Aug 1999, JD. Queensland, 1M, 1F, 1P, 14L, Bertie Creek, Telegraph Crossing (11°50'S 142°30'E), Feb 1992, DC and AW; 2MP, 36L, Cockatoo Creek, Telegraph Crossing (11°39'S 142°27'E), Feb 1992, DC and AW; 7L, Pascoe River, 60 km W of Lockhart (12°53'S 143°01'E), 10 Nov 1988, K. Walker; 5M, 4F, Archer River Crossing, Cape York Peninsula, 9 Sep 1974, MBM; 1M, 4F, Currunda Creek, trib. of Freshwater Creek, Cairns district, 30 April 1979, AW.

*Description.* *Adult.* General colour pale-medium brown. Wings (Fig. 22): forewing golden-pale brown, without irroration; hind wing paler brown. Length of forewing 5.2–6.3 mm (male), 4.9–6.1 mm (female). Vertex of head pale-medium brown; antennae straw coloured, basal segments without darker bands. Thorax golden. Male genitalia (Figs 23–25): distal lobes of tergum X strongly upturned, apices pointed both in lateral and dorsal views; width of lobes somewhat variable. Terminal segment of clasper short, triangular, about fifth length of basal segment; inner basal angle acute. Female genitalia (Figs 26, 27): elasper receptacle small; in lateral view consisting of short, narrow chimney with circular aperture at upper end, delicate sclerotisation extended anteroventral from base of chimney; separation of receptacles in dorsal view greater than 8 times width of each receptacle.

*Pupa.* Abdominal hook plates similar to *C. kakaduensis*.

*Mature larva.* Dorsum of head medium brown, lateral margins predominantly pale yellow, venter of head extensively dark brown-black. Frontoelypeus length:width ratio 1.54–1.62, anterior margin coarsely crenulate with about 15 lobes



Figures 22–30 *Cheumatopsyche wellsae* sp. nov. Adult: 22, wings; 23, male genitalia, dorsal; 24, distal lobes of male genitalia, variant; 25, male genitalia, lateral; 26, female genitalia, lateral; 27, female genitalia, dorsal. Larva: 28, frontoclypeus; 29, secondary setae near apex of frontoclypeus; 30, prosternites.

(Fig. 28); secondary setae clear, appressed, inconspicuous under dissecting microscope, those near posterior angle of frontoclypeus predominantly simple, the apex thin and whip-like (Fig. 29). Pronotum pale-medium brown; secondary setae clear, appressed and inconspicuous; primary seta 22 near anterolateral margin of pronotum long, tapered, about half length of pronotal sclerite. Posterior prosternites consisting of pair of small lateral sclerites and pair of large mesal sclerites (Fig. 30). Mesonotal and metanotal sclerites densely clothed with appressed fine, forward-directed dark setae, forming short fringe along anterior margin of both segments. Abdominal gills present on segments 1–7.

*Etymology.* The species is named for Alice Wells who collected much of the material on which the present description is based.

*Comments.* The species is widely distributed across northern Australia, and has been collected from the Pilbara and Kimberley regions of Western Australia, the Northern Territory, Cape York Peninsula in North Queensland and further south in eastern Queensland (Fig. 55). The larva has previously been designated *Chemmatopsyche* sp. 11 (Wells, 1991) and *Chemmatopsyche* sp. AV11 (Dean, 1999).

### *Chemmatopsyche dostinei* sp. nov.

Figures 31–38

*Type material.* Holotype: adult male, Adelaide River, 15 km E of Stuart Highway, Northern Territory, 15 Aug 1979, J.Blyth (NMV T-17459). Paratypes collected with holotype: 5 males, 11 females (NMV); 3 males, 3 females (ANIC).

*Other material examined.* **Western Australia.** 11M, 12F, 15 km S of Windjana Gorge, 4 Aug 1989, McCubbin; 9M, 5F, Ord River, 9 km N of Kununurra, 19 Sep 1979, JB; 1M, Geiki Gorge National Park, 9 Oct 1979, JB; 1M, Dunham River, 100 km S of Wyndham, 7 Feb 1977, MBM; 3M, 10F, Fitzroy River Crossing, Derby-Broome Road, 3 Nov 1978, MBM. **Northern Territory.** 2M, 8F, 4L, East Alligator River, Cahills Crossing (12°26'S 132°58'E), 27 May 1988, AW and PS; 2MP, South Alligator River, Kakadu Hwy crossing (13°17'S 132°19'E), 26 May 1988, PS and AW; 22L, Wildman River, Arnhem Highway (12°50'S 132°02'E), 22 Apr 1989, PS and AW; 1M, 1F, 14L, Kambolgie Creek (13°32'S 132°23'E), various dates, DC, AW and PS; 1M, Jim Jim Creek, Kakadu Hwy (12°57'S 132°33'E), 28 May 1988, PS and AW; 2MP, 9L, Nourlangie Creek (12°28'S 132°44'E), 26 May 1988, PS and AW. **Queensland.** 9M, 6F, Upper Ross River, SW of Townsville, 8 May 1979, AW; 1M, 3F, Cairns, Lake Morris Rd (16°55'S 145°46'E), 16 Nov 1988, K.Walker; 2M, 20F, Forty Mile Scrub, 65 km SW of Mt

Garnet, 19 Dec 1974, MBM; 1M, 2F, Arher River Crossing, Cape York Peninsula, 9 Sep 1974, MBM.

*Description.* *Adult.* General colour pale-medium brown. Wings (Fig. 31): forewing pale-medium brown, without irroration; hind wing very pale fawn, almost white. Length of forewing 4.2–5.2 mm (male), 5.0–5.5 mm (female). Vertex of head medium-dark brown; antennae with basal segments yellow, without oblique darker bands. Thorax medium brown. Male genitalia (Figs 32, 33): distal lobes of tergum X broad, somewhat truncate in dorsal view, separated by a distance about 3 times the width of each lobe; in lateral view each lobe upturned. Pre-anal appendages located well anterior of posterior margin of tergum X. Clasper with apical segment about quarter length of basal segment. Female genitalia (Figs 34, 35): clasper receptacle moderately large, subtriangular in lateral view; outer margin oblique, orientated anteroventral to posterodorsal; inner aperture small and dorsal; separation of receptacles in dorsal view about 2 times the width of each receptacle.

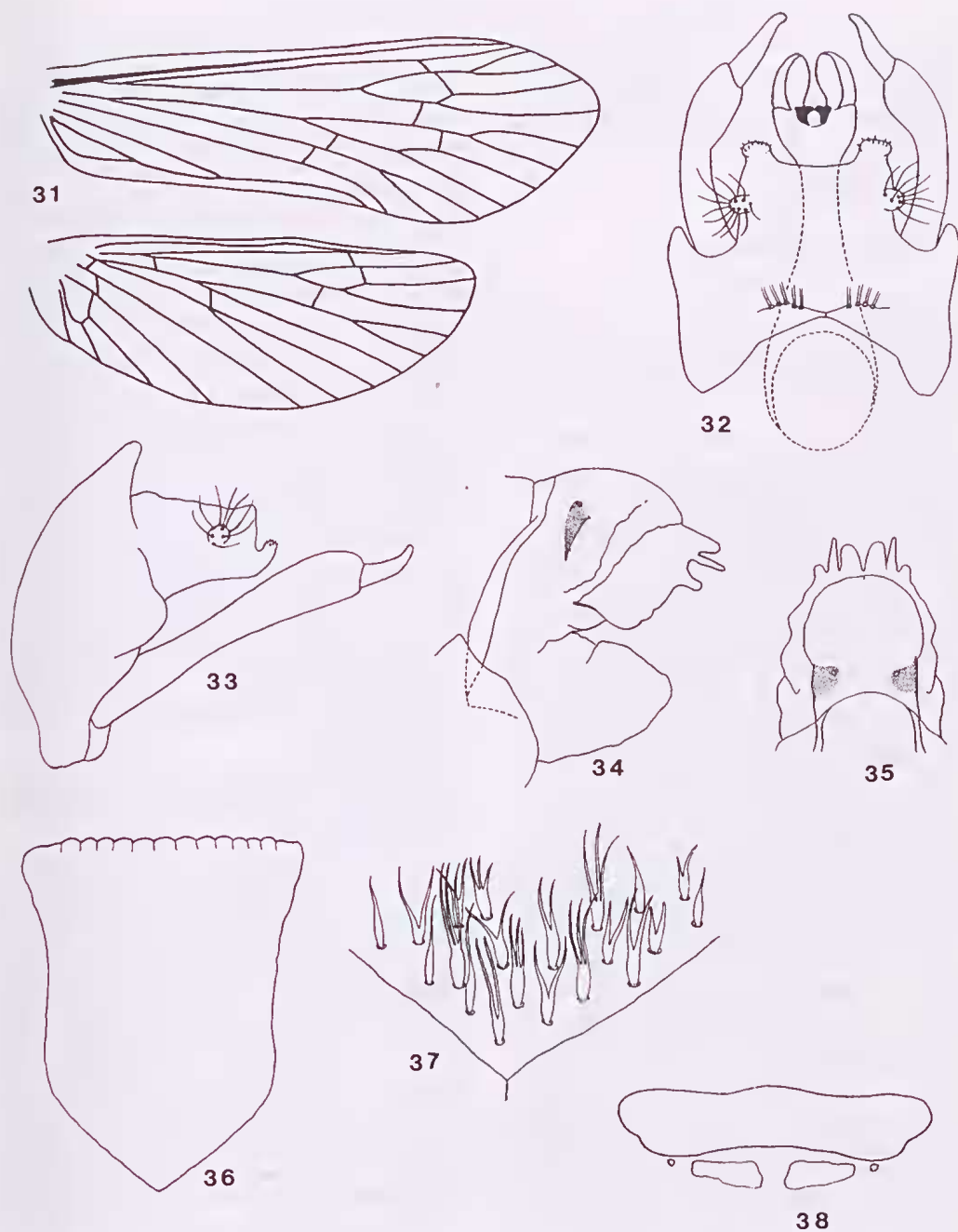
*Pupa.* Abdominal hook plates similar to *C. kakaduensis*.

*Mature larva.* Dorsum of head pale-medium brown, lateral margins predominantly pale yellow, venter of head pale-medium brown. Frontoclypeus length:width ratio 1.5–1.6, anterior margin coarsely crenulate with about 15 lobes (Fig. 36); secondary setae clear, appressed, inconspicuous under dissecting microscope, those near posterior angle of frontoclypeus predominantly bi- or multifurcate (Fig. 37). Pronotum pale-medium brown; secondary setae clear, appressed and inconspicuous; primary seta 22 near anterolateral margin of pronotum long, tapered, about half length of pronotal sclerite. Posterior prosternites consisting of pair of small lateral sclerites and pair of large mesal sclerites (Fig. 38). Mesonotal and metanotal sclerites densely clothed with appressed fine, forward-directed dark setae, forming short fringe along anterior margin of both segments. Abdominal gills present on segments 1–7.

*Etymology.* The species is named for Peter Dostine in recognition of his contribution to knowledge of the aquatic insects of northern Australia.

*Comments.* The larva is very similar to *C. wellsae*. The venter of the head capsule is medium brown in *C. dostinei* as opposed to dark brown, almost black in *C. wellsae*, and the primary seta on the dorsum of the pronotum is longer in *C. dostinei* than in *C. wellsae*, but these





Figures 31–38 *Cheumatopsyche dostinei* sp. nov. Adult: 31, wings; 32, male genitalia, dorsal; 33, male genitalia, lateral; 34, female genitalia, lateral; 35, female genitalia, dorsal. Larva: 36, frontoclypeus; 37, secondary setae near apex of frontoclypeus; 38, prosternites.

characters are not completely reliable. To separate the two species, setae near the posterior angle of the frontoelypus must be examined under high magnification. *C. dostinei* is widely distributed across northern Australia (Fig. 56). The larva has previously been referred to as *Cheumatopsyche* sp. 13 (Wells, 1991) and *Cheumatopsyche* sp. AV13 (Dean, 1999).

*Asmicridea capricornica* sp. nov.

Figures 39–52

*Type material.* Holotype: adult male, Graveside Creek, Northern Territory (13°18'S 132°32'E), 18 Jul 1988, P. Dostine (NMV T-17476). Paratypes collected with holotype: 6 males, 6 females (NMV); 6 males, 3 females (ANIC).

*Other material examined.* Western Australia. 1L, King Edward River, Mitchell Plateau, 25 Sep 1995, L. Metzeling; 3P, 14L, Manning Gorge, nr Gibb River Rd, Kimberley, 28 Jul 1994, DC; 2P, 12L, Bell Creek Gorge, Mt Hart Station, Kimberley, 26 Jul 1994, DC; 2L, Trib. Mitchell River, Mitchell Plateau, 19 Feb 1979, JEB. Northern Territory. 4M, 41F, 149L, Gulungul Creek, Radon Springs (12°45'S 132°55'E), various dates, PS and AW, JD; 7P, 143L, Magella Creek, u/s Magella Falls (12°47'S 133°06'E), various dates, AW and PS; 5P, 33L, East Alligator River, E of Magella Falls (12°47'S 133°22'E), various dates, PS and AW; 1L, South Alligator River, Gimbat OSS station (13°35'S 132°36'E), 20 Apr 1988, PS and AW; 3P, 64L, Baroalba Creek, Kubarra Pools, 12°49'S 132°52'E, various dates, AW and PS, DC, JD; 1P, 3L, Barramundie Creek, d/s Falls (13°22'S 132°28'E), 26 May 1988, AW and PS; 1L, Liverpool River, Arnhemland (12°21'S 134°07'E), 26 Aug 1999, JD. Queensland. 4L, Babinda Creek, The Boulders, 24 Nov 1979, DC; 1L, Little Mulgrave River, 10 km SW of Gordonvale, 16 Nov 1988, K. Walker; 3L, Millstream Creek, 1 Aug 1980, S. Bunn and Gray; 1L, Annan River, 30 km S of Cooktown, 20 Jun 1971, E.F. Riek.

*Description.* *Adult.* General colour pale. Wings (Fig. 39): forewing whitish, with golden tinge (female more intense than male), no obvious colour pattern except for small area of medium brown near base of wing around humeral crossvein; hindwing white, almost hyaline. Length of forewing 5.8–6.9 mm (male), 6.1–7.3 mm (female). Vertex of head and thorax pale golden colour; antennae straw coloured. Abdominal sternite 5 with lateral process about half length of segment. Male abdominal segments 6 and 7 with internal membranous sacs (Fig. 40). Male genitalia (Figs 41–45): tergite X elongate, deeply cleft, apices upturned; phallus elongate, terminating in a pair of rounded endothelial processes, and between these a pair of elongate phal-

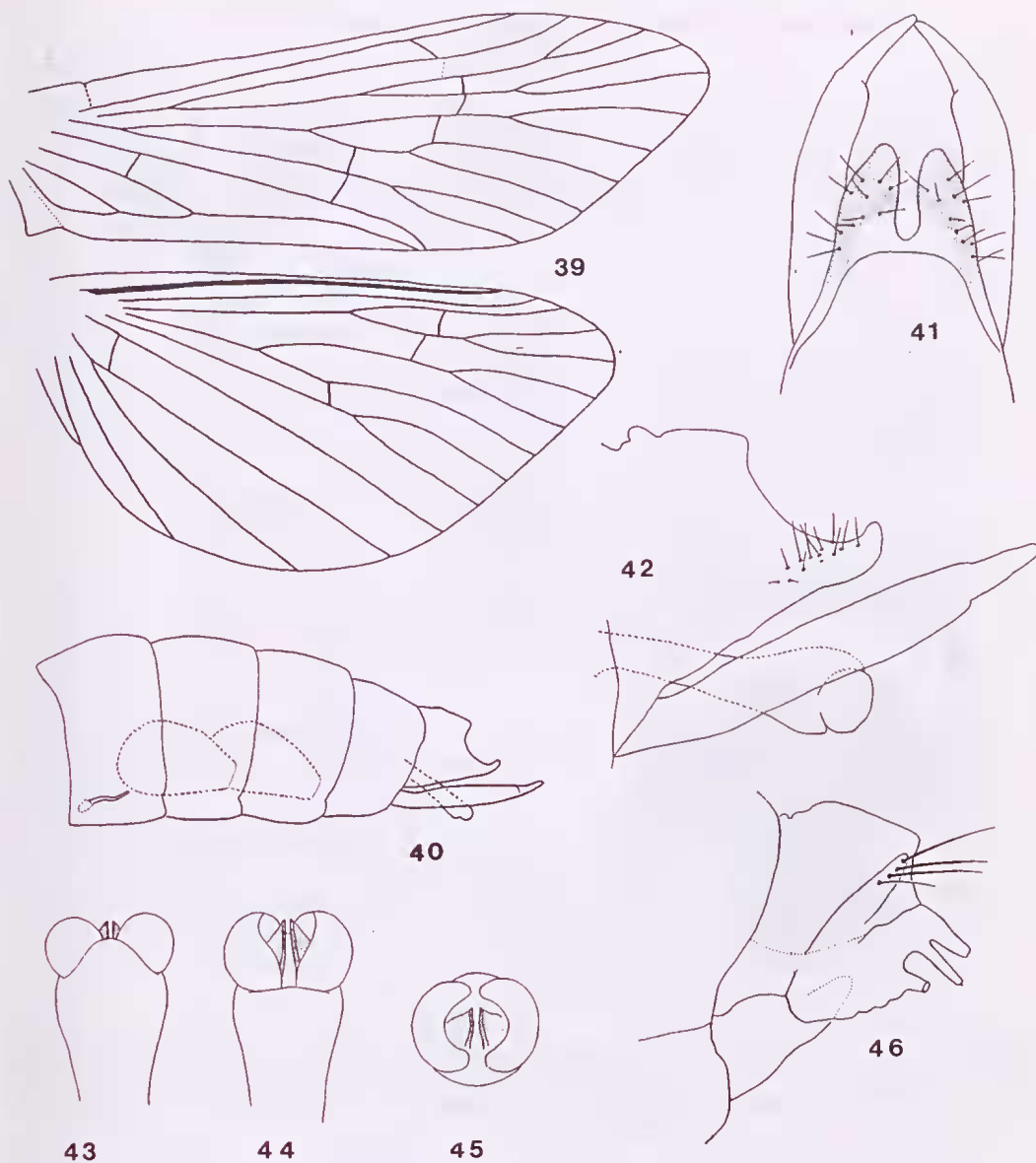
lotremal sclerites, each sclerite with a strongly acute apex. Female genitalia (Fig. 46): simple, without obvious clasper receptors or pockets.

*Pupa.* Mandibles slender (Fig. 47); right mandible with 3 subapical teeth, left mandible with 4. Abdominal segment 3 with paired anterior and posterior hook plates, segments 5–7 with anterior hook plates only (Fig. 48), segment 4 without hook plates; some variation in numbers of teeth on all plates. Apical processes of abdomen with long dorsal projection at outer apical angle, inner apical angle with 2 short projections (Fig. 49); numerous long black setae apically and also along outer lateral margin.

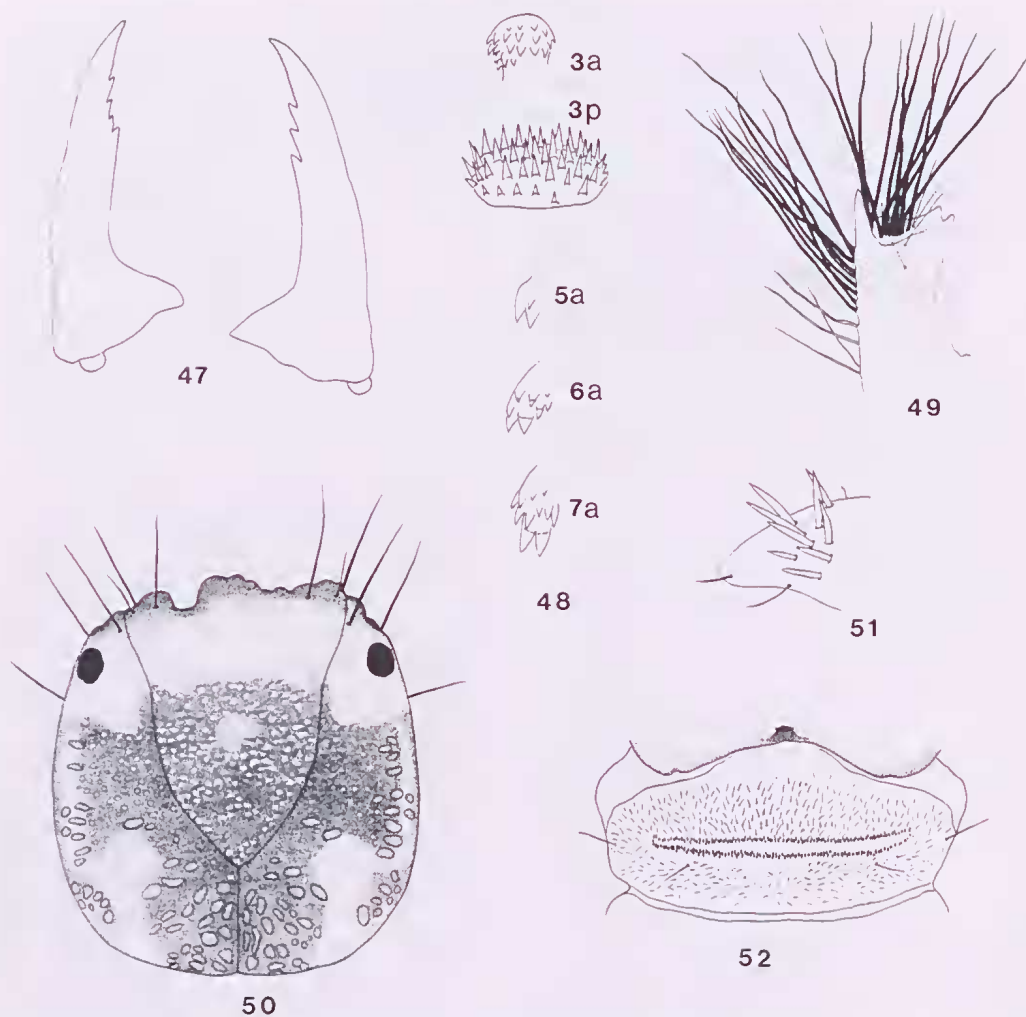
*Mature larva.* Head with distinctive pattern of yellow and pale brown, dorsal surface covered with numerous small pale dimples, particularly conspicuous on darker pigmented areas (Fig. 50). Head capsule broadest at or a little posterior to midlength; lateral margins rounded; posterior ventral apotome about third length of ecdysial line linking it with anterior ventral apotome. Frontoelypus length about two-thirds head capsule length; anterior margin with deep notch on left side, mesal lobes projecting well forward of base of notch. Foretrochantin not forked (Fig. 51). Mesosternum and metasternum each with 2 gill tufts. Abdominal segments 1 and 2 with transverse double row of stout appressed setae on dorsal surface (Fig. 52).

*Etymology.* The name recognises the broad distribution of this species across northern Australia in latitudes north of the Tropic of Capricorn.

*Comments.* The structure of male genitalia within the Australian genera *Asmicridea* and *Smicrophylax* is conservative and the genitalic structure of *A. capricornica* is similar to species of both genera. *A. capricornica* can be distinguished from the two described species of *Asmicridea* by the possession of paired membranous sacks within abdominal segments 6 and 7. This character state has previously been used to distinguish adult males of *Asmicridea* and *Smicrophylax* (Neboiss, 1977) and separation of adults becomes tenuous. Fortunately, larval characters are of greater diagnostic value and enable separation of the genera and species of *Asmicridea*. *A. capricornica* is widely distributed across northern Australia (Fig. 57), and while there is some overlap the species tends to occur further upstream in river systems than do species of the genus *Cheumatopsyche*. The larva of *A. capricornica* has previously been reported as *Asmicridea* sp. AV 3 (Dean, 1999).



Figures 39–46 *Asmicridea capricornica* sp. nov. Adult: 39, wings; 40, abdominal segments 5–10, lateral; 41, male genitalia, dorsal; 42, male genitalia, lateral; 43–45, apex of phallus, dorsal, ventral and apical; 46, female genitalia, lateral.



Figures 47–52 *Asmicridea capricornica* sp. nov. Pupa: 47, mandibles; 48, abdominal hook plates (3, 5–7: abdominal segment number, a: anterior hook plate, p: posterior hook plate); 49, apical process of abdomen. Larva: 50, head capsule, dorsal; 51, foretrochantin; 52, dorsum of abdominal segment 1.



# Keys to species of Hydropsychidae of north-western Australia and the Northern Territory

## Adults

1. Abdominal sternite 5 with lateral processes (Fig. 40); posterior wing with Se and R1 separate right to wing margin (Fig. 39).....*Asmicridea capricornica*
- Abdominal sternite 5 without lateral processes; posterior wing with Se and R1 fused prior to wing margin (Figs 1, 12, 22, 31) .....*Chemmatopsyche*...2
2. Males .....3
- Females .....6
3. Colour pale—medium brown; distal lobes of tergum X distinctly upturned in lateral view (Figs 25, 33) .....4
- Colour dark brown—black; distal lobes of tergum X rounded in both dorsal and lateral views, not upturned (Figs 3, 14).....5
4. Distal lobes of tergum X acute in both dorsal and lateral views (Figs 23–25) .....*Chemmatopsyche wellsae*
- Distal lobes of tergum X rounded in both dorsal and lateral views (Figs 32, 33) .....*Chemmatopsyche dostinei*
5. Pre-anal appendages squat, located well anterior of base of distal lobes; dorsum of segment IX broad in lateral view (Figs 2, 3)
- Pre-anal appendages elongate, located close to base of distal lobes; dorsum of segment IX narrow in lateral view (Figs 13, 14).....*Chemmatopsyche kakaduensis*
6. Clasper receptacle in lateral view small, consisting of very short chimney (Fig. 26); separation of receptacles in dorsal view about 8 times width of each receptacle (Fig. 27) .....*Chemmatopsyche wellsae*
- Clasper receptacle moderate to large (Figs 4, 15, 34); separation of receptacles in dorsal view less than 3 times width of each receptacle (Figs 5, 16, 35).....7
7. Inner aperture of elasper receptacle aligned with outer aperture (Fig. 4) .....*Chemmatopsyche kakaduensis*
- Inner aperture of elasper receptacle clearly dorsal to outer aperture (Figs 15, 34).....8
8. Outer margin of elasper receptacle semicircular; inner aperture large; separation of receptacles in dorsal view less than or equal to width of each receptacle (Figs 15, 16) .....*Chemmatopsyche suteri*
- Outer margin of elasper receptacle oblique, orientated anteroventral to posterodorsal; inner aperture small; separation of receptacles in dorsal view about twice width of each receptacle (Figs 34, 35)..*Chemmatopsyche dostinei*

## Mature larvae

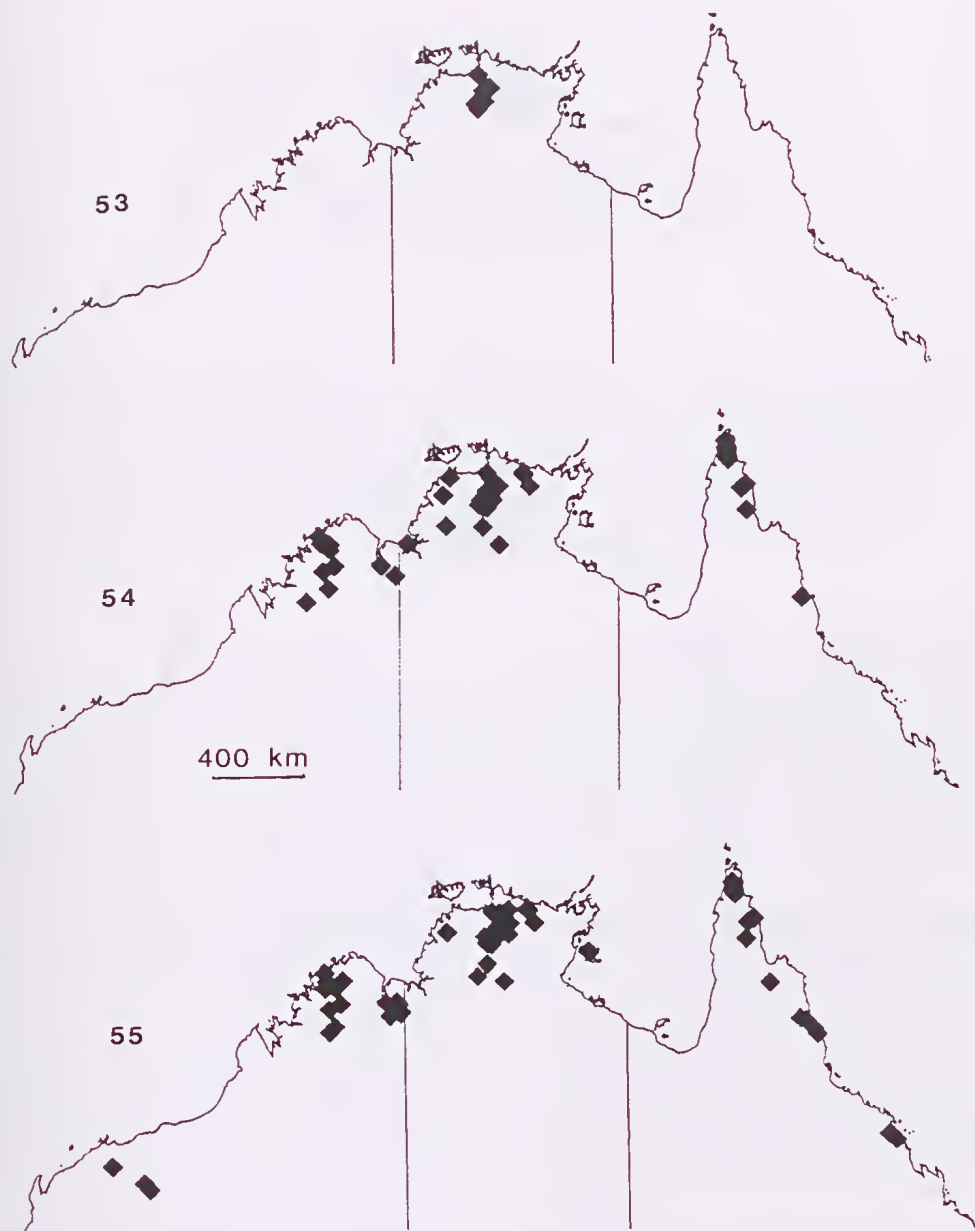
1. Foretrochantin simple (Fig. 51); terga of abdominal segments 1 and 2 each with 2 transverse rows of stout appressed setae (Fig. 52).....*Asmicridea capricornica*
- Foretrochantin forked (Fig. 21); terga of abdominal segments 1 and 2 without transverse row of setae.....*Chemmatopsyche*...2
2. Anterior margin of frontoelypeus coarsely erenulate, fewer than 20 lobes (Figs 28, 36).....3
- Anterior margin of frontoelypeus finely erenulate, more than 20 lobes (Figs 9, 17) .....4
3. Setae near apex of frontoelypeus predominantly simple (Fig. 29).....*Chemmatopsyche wellsae*
- Setae near apex of frontoelypeus predominantly divided (Fig. 37).....*Chemmatopsyche dostinei*
4. Pronotum with primary seta 22 short, less than twice length of adjacent secondary setae (Fig. 10).....*Chemmatopsyche kakaduensis*
- Pronotum with primary seta 22 long, about half length of pronotum (Fig. 19) .....*Chemmatopsyche suteri*

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Figures 53–55. Distribution of Hydropsychidae in northern Australia. 53, *Cheumatopsyche kakaduensis* sp. nov.; 54, *Cheumatopsyche suteri* sp. nov.; 55, *Cheumatopsyche wellsae* sp. nov.



Figures 56–57. Distribution of Hydropsychidae in Australia. 56, *Cheumatopsyche dostinei* sp. nov.; 57, *Asmicridea capricornica* sp. nov.